Follow-Up on LANL Technical Area 41 Beryllium Contamination Event

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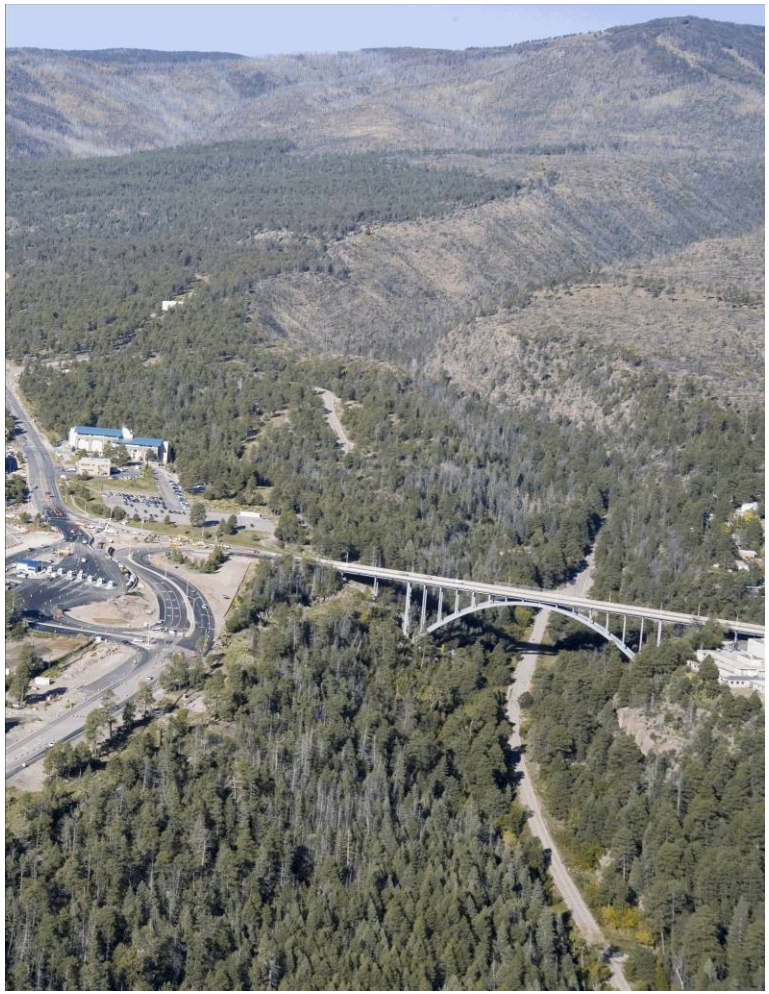
TA-41 Location and Use

TA-41 is located down Omega canyon from the bridge connecting the Lab to the town site.

The site housed office, laboratory, and secure storage areas.

Building 1 is a long, narrow vault type room dug into the side of the canyon. It is referred to as the "Tunnel".

Operations other than storage moved out of area after the 2000 Cerro Grande Fire.



Summary of Event

- Building 1 has been used for many years as a secure storage area. Operations other than storage moved out of area after the 2000 Cerro Grande Fire.
- Baseline survey in 2001 (due to stored beryllium parts) indicated the area was clean.
- Beginning in 2005, a classified, museum-like display area was established in building 1.
- An independent event in 2008 lead to sampling that indicated significant beryllium contamination.
- Contamination discovery lead to further sampling of building 1 and other areas.

Summary of Event (continued)

- Building 1 was decontaminated; but will remain posted.
- All workers who entered the building between 2001 and 2008 were notified. Information meetings were held and workers were offered beryllium medical surveillance.
- No expected exposure concerns for visitors to building; but concern for staff performing “cleaning parties” and facility work.
- The LANL Beryllium Program went through internal and external evaluation to identify areas of needed improvement.

Items Stored in the Building

PHOTO NOT PERMITTED DUE TO CLASSIFIATION CONCERNS.

Parts and test materials.

YOU CAN'T LOOK AT THIS STUFF EITHER!

Models, trainers, and historical displays.

How Did We Get There?

2001

- 54 samples were collected in the building 1 vaults.
- 51 below reporting limit of 0.03 ug/sample (94%).
- Maximum = 0.08 ug/100 cm^2.
- Mean = 0.07 ug/100 cm^2 (detectable samples).

2008

- 22 samples were collected in the building 1 vaults.
- 6 below reporting limit of 0.02 ug/sample (27%).
- Maximum = 130 ug/100 cm^2.
- Mean = 10.7 ug/100 cm^2 (detectable samples).

What Set the Stage for This Event?

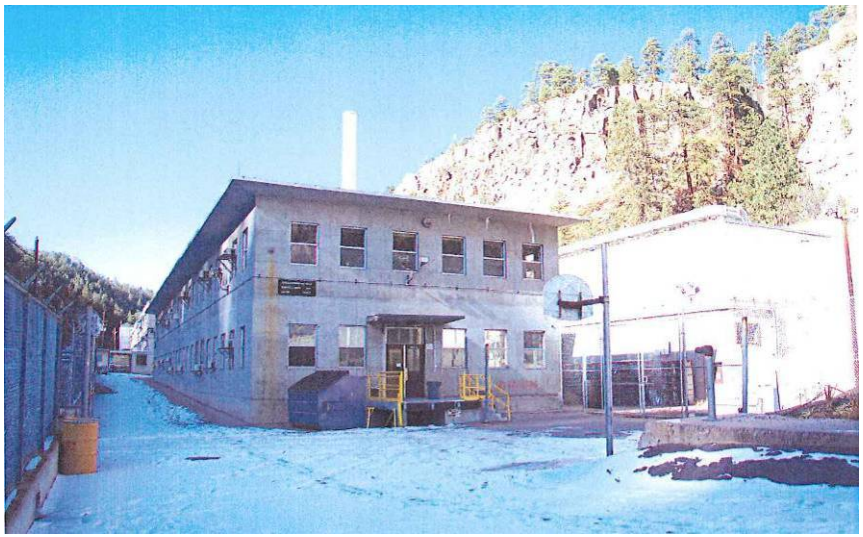
- Closure of TA-41.
- Transition of area owners, occupants, and support.
- Unintentional security/safety conflict.
- Lack of general beryllium awareness.
- Lack of recognition of task hazard.
- Attitude toward beryllium parts as “articles”.

You can get there from here!

Closure of TA-41: Out of Sight, Out of Mind

- All operations reported to have left the area.
- Road to the site is closed and locked.

Closure of TA-41: Out of Sight, Out of Mind



- Multistory office and research buildings.
- Built in 1950 and 1959. Active until 2002.

Closure of TA-41: Out of Sight, Out of Mind

- Multistory office and research buildings torn down.
- Remaining buildings “just storage”.

Closure of TA-41: Out of Sight, Out of Mind

- Once crowded parking lot and other areas are “returning to nature”.

Transition of Facility Owner and Occupants

- Facility management changed.
- Occupant groups changed.
- Industrial hygienists supporting area changed.
- Re-organizations and lateral changes in management resulted in many managers and work supervisors without detailed knowledge of history of area and previous operations.
- New occupants reported “Stuff was just there”.

Unintentional Security/Safety Conflict

- Building 1 is a secure vault.
- Museum displays are classified.
- Stored parts are classified.
- Only discussed with need to know and in secure areas.
- Good compliance with security requirements left health and safety personnel out of the loop.

Lack of General Beryllium Awareness

- Group using building is involved with systems technology; intelligence, weapons technology assessment, diagnostics and non-proliferation.
- Group using building is not involved with fabrication or testing of beryllium parts, so would have limited experience with beryllium hazards. Only a few had beryllium awareness or beryllium worker training.
- Lack of “Herd Immunity” – Similar to vaccinations; if enough members of a group have knowledge of a material and its hazards, the entire group can be protected.

Lack of Recognition of Task Hazard.

- Workers recognized beryllium parts were present, but did not believe they were doing anything to cause exposure.
- Beryllium parts having undergone destructive testing may not have been properly packaged.
- Contamination followed a pattern of “point to point” spread. Highest on one set of shelves and the floor in front of shelves. Also on areas likely to be touched.
- “Cleaning parties” using brooms, dry rags, and standard shop vacuums may have exposed some workers to airborne beryllium. Facility work also a concern.

Beryllium parts as “Articles”

Question: *When is an article not an article?*

Answer: *When it’s made out of beryllium.*

- We need to carefully reconsider any rule exemptions and handling requirements for beryllium “articles”.
- What is an “article” today, may produce exposure and contamination spread in the future. Parts oxidize over time.
- It is often assumed that finished beryllium parts that are not cut or abraded are articles under the beryllium rule.
- The concept of beryllium parts as “articles” can lead to a complacent attitude that assumes there is no hazard.

Surface Contamination on “Articles”

Beryllium parts that might be considered “articles” and their packaging can have significant removable surface contamination.

Part (ug/100 cm^2)	Package (ug/100 cm^2)
< 0.01	0.02
20.1	46.4
16.3	2.4
22.7	10.7
14.3	26.5
5.7	2.9

Green - Only beryllium part sampled without detectable surface beryllium.

Yellow - Average for several rough cut stock pieces in a plastic box.

White - Clean, finished parts fabricated in ‘60s and stored in plastic bags.

Airborne Beryllium from “Articles”

A review of sampling data reveals that airborne beryllium can be generated by handling parts that might be considered “articles”.

- Unpack and rad survey 60 beryllium parts:
  0.02, 0.05, & 0.09 ug/m^3 8hr TWA
  1.0 ug/m^3 STEL
- Survey and move parts to other location:
  7 of 25 samples detectable, maximum = 0.12 ug/m^3
- Cleaning and packaging parts for shipment:
  11 of 11 samples detectable, mean = 0.35 ug/m^3
  4 above action level, maximum = 1.78 ug/m^3

Note: Respiratory protection and PPE used during these activities.

Beryllium Program Response

- New requirements and posting for beryllium storage areas.
- More formal area transition requirements.
- Updated beryllium inventory with more detailed information.
- Annual inspections and sampling for all operations and areas.
- Documented sampling plans for all operations and areas.
- Awareness level training being evaluated and issues resolved.

What Can You Take Home From This Event?

- Closure of TA-41.
  - Don't assume anything when a site appears to be abandoned.
- Transition of area owners, occupants, and support.
  - Formal transition and documentation of conditions and hazards.
- Unintentional security/safety conflict.
  - Health/Safety professionals have a need to know.
- Lack of general beryllium awareness.
  - Minimum of beryllium awareness when parts/articles are present.
- Lack of recognition of task hazard.
  - Quantified IH to evaluate all beryllium activities (even "articles").
- Attitude toward beryllium parts as "articles".
  - Evaluate all "articles". Make managers and workers aware.

Questions

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